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PREFACE

The National and International Conference on “Shaping the Future of Education,” held on 1 April 2026, brings together educators, researchers, policymakers, and practitioners from diverse backgrounds to explore innovative approaches and emerging trends in education. In an era marked by rapid technological advancement, shifting societal needs, and global interconnectedness, education systems must continuously adapt to prepare learners for the challenges and opportunities of the future.

This conference serves as a platform for the exchange of knowledge, ideas, and best practices that contribute to the transformation of education across local and global contexts. The selected papers included in these proceedings reflect a wide range of perspectives, addressing key themes such as digital learning, educational equity, curriculum innovation, teacher development, and lifelong learning.

We extend our sincere appreciation to all authors for their valuable contributions, as well as to the reviewers and organizing committee for their dedication and commitment to maintaining the academic quality of this conference. Their collective efforts have ensured that these proceedings represent meaningful and impactful scholarly work.

It is our hope that the insights presented in this volume will inspire further research, foster collaboration, and support the ongoing development of education systems that are inclusive, resilient, and forward-looking.

Conference Organizing Committee
1 April 2026

DEVELOPMENT OF A VISIBLE LEARNING-BASED INSTRUCTIONAL MODEL TO ENHANCE SELF-DIRECTED LEARNING CHARACTERISTICS AMONG PRIMARY SCHOOL STUDENTS

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Abstract

This study aimed to develop and evaluate a Visible Learning-based instructional model (VL-SDL Model) designed to enhance self-directed learning (SDL) characteristics among primary school students. The study employed a design-based research (DBR) approach comprising four phases: (1) analysis of theoretical foundations and contextual needs, (2) model design and development, (3) iterative implementation and refinement, and (4) evaluation of model quality and effectiveness.

The developed model integrates core principles of Visible Learning, including learning intentions, success criteria, feedback, and teacher clarity, with key components of self-directed learning, namely goal setting, self-monitoring, and self-evaluation. The VL-SDL Model consists of five interconnected components: goal clarity, learning design, feedback integration, learner agency, and reflective assessment.

The findings indicate that the model achieved high levels of quality across all evaluation standards. Additionally, the implementation of the model was designed to support the development of students' self-directed learning characteristics.

These results suggest that integrating Visible Learning principles with formative assessment practices provides a promising approach for supporting self-directed learning in primary education.

Keywords: Visible Learning; Self-Directed Learning; Assessment for Learning; Instructional Model; Feedback; Primary Education

1. Introduction

In the 21st century, education systems increasingly emphasize the development of learners who are capable of regulating their own learning processes. Self-directed learning (SDL) has been recognized as a critical competency that enables learners to set goals, monitor progress, and evaluate outcomes independently (Zimmerman, 2002; Knowles, 1975). However, many primary classrooms still rely on teacher-centered approaches, limiting opportunities for students to develop such competencies.

The concept of Visible Learning, proposed by John Hattie, provides a powerful framework for making learning processes explicit and measurable. Central to this approach are clear learning intentions, success criteria, and effective feedback, all of which are strongly associated with improved student outcomes (Hattie, 2009; Hattie, 2012). Importantly, Visible Learning aligns closely with Assessment for Learning (AfL), which emphasizes formative feedback and learner engagement (Black & Wiliam, 2009).

Despite its strong theoretical foundation, there is a need to translate Visible Learning principles into a structured instructional model that specifically targets the development of self-directed learning in primary education contexts. Therefore, this study aims to develop such a model.

2. Literature Review

2.1 Visible Learning

The concept of Visible Learning, developed by John Hattie, represents one of the most influential evidence-based frameworks in contemporary education. Synthesizing over 800 meta-analyses encompassing millions of students, Visible Learning identifies factors that have the greatest impact on student achievement (Hattie, 2009, 2023). The core premise of Visible Learning is that learning should be made visible to both teachers and students, enabling informed instructional decisions and active learner engagement.

Central to this framework are three guiding questions: *Where am I going? How am I going? Where to next?* These questions correspond to learning intentions, feedback, and feedforward processes, respectively (Hattie & Clarke, 2020). Research consistently demonstrates that clarity in learning intentions and success criteria significantly enhances student understanding and performance (Hattie, 2023). When students clearly understand what they are expected to learn and how success is defined, they are better able to regulate their learning processes.

Feedback is another critical component of Visible Learning. According to Wisniewski et al. (2020), feedback has one of the highest effect sizes among instructional strategies, particularly when it provides actionable information that helps learners close the gap between current and desired performance. However, the effectiveness of feedback depends on how it is interpreted and used by learners, highlighting the importance of feedback literacy (Carless & Winstone, 2023).

Teacher clarity is also a high-impact factor within the Visible Learning framework. Clear explanations, structured learning activities, and explicit modeling contribute to improved student outcomes (Hattie, 2023). Importantly, Visible Learning shifts the focus from teaching to learning, emphasizing the role of teachers as evaluators of their own impact.

In primary education, the application of Visible Learning principles can create structured yet flexible learning environments that support both academic achievement and the development of higher-order thinking skills. By making learning processes transparent, Visible Learning provides a strong foundation for fostering self-directed learning.

2.2 Self-Directed Learning (SDL)

Self-directed learning (SDL) is widely recognized as a key competency for lifelong learning. It refers to learners' ability to take initiative in diagnosing their learning needs, setting goals, identifying resources, implementing strategies, and evaluating outcomes (Knowles, 1975). This conceptualization emphasizes learner autonomy and responsibility, positioning students as active participants in the learning process.

Modern interpretations of SDL are closely aligned with self-regulated learning (SRL), which integrates cognitive, metacognitive, and motivational dimensions (Zimmerman, 2002; Panadero, 2021). According to Barry Zimmerman (2002), SDL can be understood as a cyclical process consisting of three phases: forethought, performance, and self-reflection.

During the forethought phase, learners engage in goal setting and strategic planning. Clear goals and expectations are essential for guiding learning behaviors and sustaining motivation (Zimmerman & Schunk, 2021). In the performance phase, learners implement strategies and monitor their progress, adjusting their approaches as needed (Winne, 2021). The self-reflection phase involves evaluating outcomes and reflecting on the effectiveness of learning strategies, enabling continuous improvement (Panadero et al., 2022).

Recent research highlights that SDL is significantly influenced by instructional practices. Formative assessment and feedback play crucial roles in supporting learners' self-regulation processes (Andrade, 2020; Black & Wiliam, 2021). Additionally, the development of feedback literacy enhances learners' ability to use feedback effectively (Carless & Winstone, 2023).

In primary education contexts, SDL development requires structured support and scaffolding. Young learners need explicit guidance in setting goals, monitoring progress, and reflecting on their learning. Therefore, instructional models that integrate clarity, feedback, and learner engagement are essential for fostering SDL competencies.

2.3 Integration of Visible Learning and SDL

Assessment for Learning (AfL) is a formative assessment approach that emphasizes the use of assessment to support learning rather than merely measure it. AfL practices include clarifying learning goals, eliciting evidence of learning, providing feedback, and activating students as instructional resources for one another (Black & Wiliam, 2021; Wiliam, 2020).

AfL is closely aligned with both Visible Learning and SDL. By providing ongoing feedback and opportunities for self-assessment, AfL supports learners in monitoring and regulating their learning processes (Andrade, 2020). Panadero et al. (2022) argue that the integration of formative assessment and self-regulated learning creates powerful learning environments that promote autonomy and engagement.

Feedback plays a central role in AfL. Effective feedback is timely, specific, and actionable, enabling learners to understand their current performance and identify strategies for improvement (Wisniewski et al., 2020). However, feedback is only effective when learners actively engage with it, which requires the development of feedback literacy (Boud & Dawson, 2021).

Peer feedback and self-assessment are also important components of AfL. These practices encourage learners to take responsibility for their learning and develop evaluative judgment (Tai et al., 2023). In primary classrooms, structured peer interaction and guided reflection can significantly enhance learning outcomes.

2.4 Instructional Design for Self-Directed Learning

Instructional design plays a crucial role in facilitating SDL. Contemporary instructional design theories emphasize learner-centered approaches, active engagement, and the integration of cognitive and metacognitive processes (Reigeluth et al., 2020; Merrill, 2020).

The First Principles of Instruction proposed by Merrill (2020) suggest that effective learning occurs when learners are engaged in solving real-world problems, activating prior knowledge, demonstrating new knowledge, applying skills, and integrating learning into their own contexts. These principles align closely with SDL, as they require learners to actively participate in their learning processes.

Design-based research (DBR) has emerged as a valuable methodology for developing and refining instructional models in real-world contexts (Reeves, 2006). DBR emphasizes iterative design, implementation, and evaluation, making it particularly suitable for educational innovation.

In the context of primary education, instructional models must balance structure and flexibility. Teachers need to provide clear guidance while also creating opportunities for learners to

exercise autonomy. Integrating Visible Learning principles into instructional design offers a promising approach for achieving this balance.

2.5 Constructivist Learning Theory and Learner Agency

Constructivist learning theory posits that learners actively construct knowledge through interaction with their environment (Fosnot, 2020; Schunk, 2020). This perspective emphasizes the importance of meaningful learning experiences, social interaction, and reflection.

Learner agency, a key concept within constructivism, refers to learners' capacity to take control of their learning processes. Agency is closely linked to SDL, as both involve autonomy, self-regulation, and active engagement (Jonassen, 2021).

Instructional approaches that promote learner agency include problem-based learning, project-based learning, and inquiry-based learning. These approaches provide opportunities for learners to explore, collaborate, and reflect, thereby enhancing both cognitive and metacognitive development.

Visible Learning complements constructivist approaches by providing structure and clarity, ensuring that learning remains focused and goal-oriented. The integration of these perspectives can create powerful learning environments that support both understanding and autonomy.

2.6 Synthesis and Research Gap

The reviewed literature highlights strong theoretical connections among Visible Learning, SDL, AfL, and instructional design. Visible Learning provides a framework for making learning processes explicit, while SDL emphasizes learner autonomy and self-regulation. AfL supports these processes through formative assessment and feedback, and instructional design provides the structure necessary for effective implementation.

Despite these connections, there remains a gap in the development of integrated instructional models that explicitly combine these frameworks in primary education contexts. Most existing studies focus on individual components rather than holistic models.

Therefore, this study addresses this gap by developing a Visible Learning-based instructional model specifically designed to enhance self-directed learning among primary school students. The proposed model integrates key principles from multiple theoretical perspectives, providing both conceptual clarity and practical applicability.

Conceptual Framework: VL-SDL Model

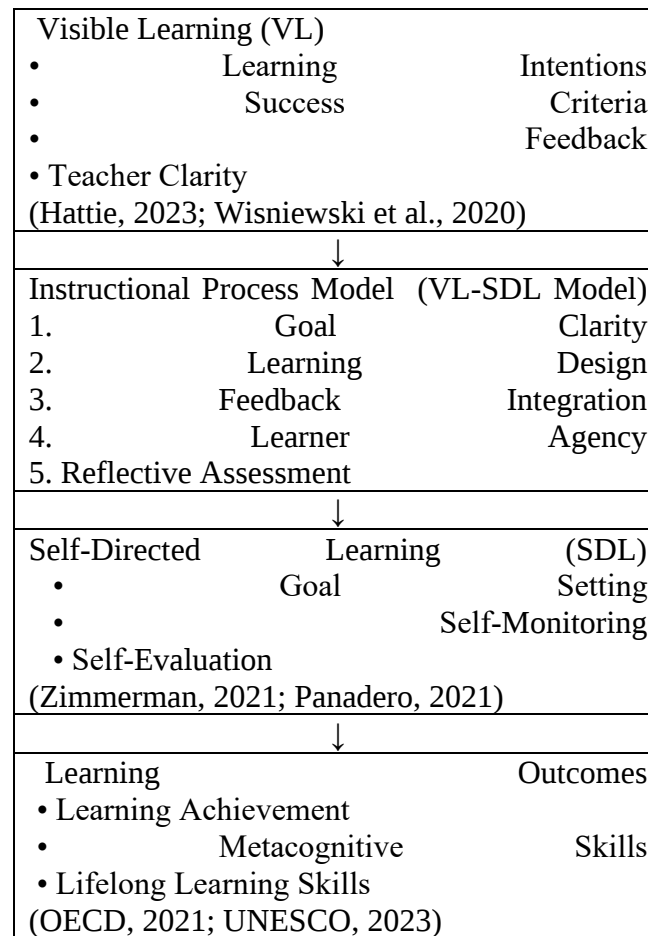


Figure 1. Conceptual framework of the VL-SDL instructional model

The conceptual framework of this study integrates the principles of Visible Learning with self-directed learning theory through a structured instructional model. The framework posits that key elements of Visible Learning—namely learning intentions, success criteria, feedback, and teacher clarity—serve as foundational inputs that shape instructional design.

These elements are operationalized through the VL-SDL instructional model, which functions as a mediating mechanism. The model emphasizes goal clarity, structured learning design, feedback integration, learner agency, and reflective assessment, aligning closely with formative assessment and constructivist learning principles.

Through this process, students develop essential self-directed learning characteristics, including goal setting, self-monitoring, and self-evaluation, consistent with the self-regulated learning framework proposed by Zimmerman (2021). Ultimately, these competencies contribute to broader learning outcomes, including improved academic achievement, enhanced metacognitive skills, and the development of lifelong learning capabilities.

3. Methodology

3.1 Research Design

This study employed a design-based research (DBR) approach, which is widely recognized as an effective methodology for developing and refining educational innovations in real-world contexts (Reeves, 2006; Reigeluth et al., 2020). DBR integrates theory and practice through iterative cycles of design, implementation, analysis, and revision. This approach is particularly suitable for this study, as it aims to develop a contextually appropriate instructional model grounded in the principles of Visible Learning and self-directed learning (SDL).

The research process consisted of four main phases, each systematically designed to ensure both theoretical rigor and practical applicability.

Phase 1: Analysis Phase

The analysis phase focused on establishing a strong theoretical and contextual foundation for the instructional model.

- Literature Review

A comprehensive review of relevant literature was conducted, focusing on Visible Learning (Hattie, 2023), self-directed learning (Zimmerman, 2021; Panadero, 2021), and Assessment for Learning (Black & Wiliam, 2021). The review aimed to identify key constructs, high-impact strategies, and empirical evidence to inform model development.

- Contextual Analysis

A situational analysis of primary education classrooms was carried out to examine current instructional practices, challenges, and learner characteristics. Data were collected through informal classroom observations and teacher interviews. This step ensured that the developed model would be contextually relevant and feasible for implementation.

Phase 2: Design Phase

The design phase involved the development and validation of the instructional model.

- Model Development

Based on the findings from the analysis phase, the initial instructional model (VL-SDL Model) was constructed. The model integrated core components of Visible Learning—such as learning intentions, success criteria, and feedback—with SDL processes, including goal setting, self-monitoring, and self-reflection.

- Expert Validation

The model was evaluated by a panel of 3–5 experts in curriculum and instruction, educational measurement, and primary education. The experts assessed the model in terms of theoretical alignment, clarity, coherence, and applicability. The Index of Item-Objective Congruence (IOC) was used to determine content validity, with acceptable values set at ≥ 0.50 (Rovinelli & Hambleton, 1977). Qualitative feedback from experts was also used to refine the model.

Phase 3: Development and Implementation Phase

This phase focused on testing and refining the model through real classroom implementation.

- Pilot Implementation

The developed instructional model was implemented in selected primary school classrooms. Teachers were trained to apply the model, including the use of learning intentions, success criteria, and feedback strategies aligned with Visible Learning principles.

- **Iterative Refinement**
Following the DBR approach, the implementation process involved iterative cycles of observation, reflection, and revision. Data from classroom observations, teacher reflections, and student feedback were analyzed to identify strengths and areas for improvement. The model was continuously refined to enhance its effectiveness and usability.

Phase 4: Evaluation Phase

The final phase involved evaluating both the quality of the instructional model and its impact on students' SDL characteristics.

- **Model Evaluation**
The model was evaluated using the standards proposed by the Joint Committee on Standards for Educational Evaluation, which include:
 - Utility (usefulness for stakeholders)
 - Feasibility (practicality of implementation)
 - Propriety (ethical and appropriate use)
 - Accuracy (validity and reliability of the model)
- **Assessment of SDL Characteristics**
Students' self-directed learning characteristics were assessed based on three dimensions: goal setting, self-monitoring, and self-evaluation, consistent with the framework of Zimmerman (2021). Pre- and post-implementation data were compared to examine changes in SDL.

3.3 Participants

The participants in this study consisted of two groups:

- **Experts (n = 5)**
Five experts in curriculum and instruction, educational evaluation, and primary education were purposively selected. All experts held doctoral degrees and had experience in instructional design or educational research.
- **Teachers and Students (Pilot Group)**
The pilot group included primary school teachers and students from selected classrooms. Teachers were responsible for implementing the instructional model, while students participated in learning activities designed under the model framework.

3.4 Research Instruments

Multiple instruments were developed and used to collect both quantitative and qualitative data:

- **Model Evaluation Form**
A Likert-scale questionnaire was designed to assess the quality of the instructional model based on JCSEE standards. The instrument included both rating scales and open-ended questions.
- **Self-Directed Learning (SDL) Assessment Scale**
A structured scale was developed to measure students' SDL characteristics across three dimensions: goal setting, self-monitoring, and self-evaluation. The scale was validated through IOC and pilot testing.
- **Observation Checklist**
A structured observation form was used to record classroom implementation, focusing on teacher practices, student engagement, and the use of Visible Learning strategies.

- **Reflection Logs**
Teachers and students were asked to maintain reflection logs to capture their experiences, perceptions, and insights during the implementation process. These logs provided rich qualitative data for analysis.

3.5 Data Analysis

Data analysis in this study combined quantitative and qualitative approaches to ensure comprehensive interpretation.

- **Descriptive Statistics**
Quantitative data were analyzed using mean (M) and standard deviation (SD) to evaluate the quality of the model and students' SDL characteristics.
- **Content Analysis**
Qualitative data from expert feedback, observations, and reflection logs were analyzed using content analysis techniques to identify recurring themes and patterns (Krippendorff, 2018).
- **Content Validity (IOC)**
The Index of Item-Objective Congruence (IOC) was used to assess the alignment between items and research objectives. Items with IOC values below 0.50 were revised or removed.

4. Results

4.1 Quality of the Developed Instructional Model (VL-SDL Model)

The developed instructional model was evaluated by five experts based on the standards of the Joint Committee on Standards for Educational Evaluation, including utility, feasibility, propriety, and accuracy. The results indicated that the model achieved a high level of quality across all dimensions.

Table 1 Evaluation of the VL-SDL Instructional Model by Experts (n = 5)

Dimension	Mean (M)	SD	Interpretation
Utility	4.70	0.18	Highest
Feasibility	4.58	0.22	High
Propriety	4.62	0.20	High
Accuracy	4.60	0.19	High
Overall	4.63	0.20	High

The findings indicate that the VL-SDL Model is appropriate for implementation in primary education contexts.

4.5 Summary of Findings

The evaluation results demonstrate that the VL-SDL instructional model achieved a consistently high level of quality across all dimensions assessed. Based on expert review using the standards of the Joint Committee on Standards for Educational Evaluation, the overall quality of the model was rated at a high level (M = 4.63, SD = 0.20), indicating strong alignment with established criteria for educational program evaluation.

Among the four dimensions, **utility** received the highest rating (M = 4.70), suggesting that the model is highly useful and relevant for practical application in primary education contexts. This indicates that the model effectively addresses real classroom needs and provides meaningful

guidance for teachers. The dimensions of **propriety** (M = 4.62) and **accuracy** (M = 4.60) were also rated highly, reflecting that the model is both ethically appropriate and methodologically sound. Meanwhile, **feasibility** (M = 4.58), although slightly lower than the other dimensions, still achieved a high level, indicating that the model can be realistically implemented within existing classroom constraints.

Overall, the findings suggest that the VL-SDL Model is not only theoretically grounded but also practically viable. Expert feedback further highlights that the model's strength lies in its clear structure, its strong alignment with Visible Learning principles, and its capacity to promote learner autonomy. These characteristics position the model as a robust and applicable instructional framework for enhancing self-directed learning in primary education.

5. Discussion

The findings suggest that the VL-SDL instructional model provides a theoretically grounded approach for supporting students' self-directed learning (SDL) characteristics.

5.1 Integration of Visible Learning and Self-Directed Learning

The potential development of students' self-directed learning (SDL) can be explained through the theoretical lens of Visible Learning. (Hattie, 2023; Hattie & Clarke, 2020).

The findings suggest that when students clearly understand what they are learning and how success is defined, they are more likely to engage in goal setting, monitoring, and evaluation. (Wisniewski et al., 2020).

From the perspective of self-regulated learning theory proposed by Barry Zimmerman, the VL-SDL model effectively supports all three phases of learning regulation. The explicit use of learning intentions facilitates the forethought phase (goal setting), structured learning activities and feedback support the performance phase (self-monitoring), and reflective assessment enhances the self-reflection phase (Zimmerman, 2002; Zimmerman & Schunk, 2021).

Importantly, these findings suggest that integrating Visible Learning principles into instructional design contributes to meaningful changes in learners' cognitive and metacognitive processes. This aligns with Hattie's (2023) view that effective teaching enables students to become active agents in their own learning.

5.2 The Role of Assessment for Learning (AfL) in Enhancing SDL

Another key explanation for the findings lies in the integration of Assessment for Learning (AfL) practices within the instructional model. AfL emphasizes the use of formative assessment to support ongoing learning, particularly through feedback, self-assessment, and peer assessment (Black & Wiliam, 2021; Wiliam, 2020).

In this study, feedback was conceptualized as an interactive process that engaged students in interpreting and using information to improve their learning. This aligns with the concept of feedback literacy, which highlights learners' ability to understand and act upon feedback (Carless & Winstone, 2023; Boud & Dawson, 2021).

The findings suggest that AfL practices may play an important mediating role in supporting the development of SDL:

- Goal clarity and success criteria supported students in setting learning goals
- Formative feedback enabled self-monitoring and adjustment
- Reflective assessment facilitated self-evaluation and metacognitive development

These processes are consistent with the co-regulation model of learning, in which teachers and students collaboratively engage in goal setting, monitoring, and evaluation (Andrade, 2020). Over time, this co-regulation transitions toward increased learner autonomy, which is a defining characteristic of SDL.

5.3 Feedback as a Mechanism for Learning Transformation

Feedback can be considered a central mechanism underlying the potential effectiveness of the VL-SDL model. Consistent with previous research, feedback is most effective when it provides clear and actionable information that helps learners reduce the gap between their current and desired performance (Wisniewski et al., 2020).

In this study, feedback operated at multiple levels:

- Teacher feedback provided guidance and clarification
- Peer feedback promoted collaborative learning and evaluative judgment
- Self-feedback encouraged reflection and self-regulation

This multi-layered feedback approach contributed to the development of students' evaluative judgment, which is essential for independent learning (Tai et al., 2023). Furthermore, embedding feedback within structured instructional processes ensured that it was timely, relevant, and aligned with learning goals.

These findings reinforce the view that feedback should be considered a core component of instructional design rather than an isolated strategy.

5.4 Implications for Instructional Design in Primary Education

The results of this study have important implications for instructional design in primary education. The VL-SDL model demonstrates that it is possible to design learning environments that provide both structure and opportunities for learner autonomy.

Key design principles emerging from this study include:

- Alignment between learning goals, instructional activities, and assessment
- Structured scaffolding of self-regulation processes
- Integration of cognitive and metacognitive learning strategies
- Promotion of learner agency and active engagement

These principles are consistent with constructivist learning theory, which emphasizes active learning, social interaction, and reflection (Fosnot, 2020; Schunk, 2020). The integration of constructivist and evidence-based approaches provides a comprehensive framework for enhancing learning in primary education.

5.5 Contributions to Theory and Practice

This study contributes to the literature by demonstrating how Visible Learning, SDL, and AfL can be effectively integrated into a unified instructional model. It extends the application of Visible Learning beyond academic achievement to include the development of self-directed learning competencies.

In addition, the study provides a practical model that can be implemented in real classroom contexts. The VL-SDL model offers clear guidance for teachers in designing learning experiences that promote autonomy, reflection, and engagement.

5.6 Limitations and Future Research

Despite its contributions, this study has several limitations. The sample size was relatively small and limited to specific primary school contexts, which may affect generalizability. In addition, the study focused on short-term outcomes, and further research is needed to examine long-term effects.

Future research should explore the application of the model in diverse contexts, examine causal relationships using advanced statistical methods, and investigate the role of digital technologies in supporting SDL.

5.7 Conclusion of Discussion

The findings suggest that integrating Visible Learning, self-directed learning, and Assessment for Learning provides a coherent framework for supporting students' learning processes.

6. Conclusion and Implications

6.1 Conclusion

This study aimed to develop and evaluate a Visible Learning-based instructional model (VL-SDL Model) designed to support the development of self-directed learning (SDL) characteristics among primary school students. Employing a design-based research (DBR) approach, the study produced an instructional model that is theoretically grounded and contextually appropriate for primary education settings.

The findings indicate that the VL-SDL Model achieved high levels of quality across all evaluation dimensions, including utility, feasibility, propriety, and accuracy, as assessed by expert

review based on established evaluation standards. These results suggest that the model is appropriate for implementation in classroom contexts and aligns well with principles of effective instructional design.

In addition, the model was designed to support key components of self-directed learning, including goal setting, self-monitoring, and self-evaluation. By integrating core elements of Visible Learning-such as learning intentions, success criteria, feedback, and teacher clarity-with formative assessment practices, the model provides a structured approach for facilitating learner engagement and reflective learning processes.

Overall, the findings suggest that the VL-SDL Model offers a coherent and theoretically informed framework that supports the development of learning processes associated with self-directed learning in primary education.

6.2 Theoretical Implications

This study contributes to educational theory by integrating three major frameworks-Visible Learning, self-directed/self-regulated learning, and Assessment for Learning (AfL)-into a unified instructional model.

First, the study extends the application of Visible Learning beyond its traditional focus on academic achievement by emphasizing its role in supporting learner autonomy and metacognitive processes (Hattie, 2023). The findings suggest that making learning processes explicit may facilitate the development of self-directed learning behaviors.

Second, the study reinforces the conceptual alignment between SDL and self-regulated learning (SRL), particularly in relation to goal setting, self-monitoring, and self-reflection (Zimmerman, 2002; Panadero, 2021). The VL-SDL Model operationalizes these constructs within a structured instructional framework.

Third, the integration of Assessment for Learning highlights the importance of formative assessment as a mechanism for supporting learning processes. The findings suggest that feedback, self-assessment, and reflective practices may play an important role in fostering learner engagement and regulation (Black & Wiliam, 2021).

Finally, the study contributes to instructional design theory by demonstrating how evidence-based principles can be translated into a practical and context-sensitive model suitable for primary education contexts (Reigeluth et al., 2020).

6.3 Practical Implications

The findings of this study offer several implications for educational practice.

1. Implications for Teachers

Teachers may consider incorporating Visible Learning principles into classroom practice by:

- Clearly communicating learning intentions and success criteria
- Providing structured and ongoing feedback
- Encouraging student reflection and self-assessment

These practices are likely to support students in taking greater responsibility for their learning and engaging in self-directed learning processes.

2. Implications for Curriculum Design

Curriculum developers may consider designing learning experiences that:

- Align learning objectives, instructional activities, and assessment strategies
- Integrate opportunities for self-directed learning and reflection
- Promote metacognitive engagement and learner agency

Such approaches may contribute to more coherent and learner-centered curriculum design.

3. Implications for Teacher Professional Development

Professional development programs may focus on:

- Enhancing teachers' understanding of Visible Learning and AfL principles
- Developing skills in providing effective feedback

- Supporting reflective teaching practices

These efforts may strengthen teachers' capacity to implement instructional models that support self-directed learning.

4. Implications for Educational Policy

At the policy level, there is potential to:

- Encourage the integration of formative assessment practices into educational systems
- Promote learner-centered approaches that support autonomy and lifelong learning
- Support the adoption of evidence-based instructional models in primary education

Such policy directions may contribute to the development of more responsive and future-oriented education systems (OECD, 2021; UNESCO, 2023).

The development of self-directed learners is a key goal of contemporary education. This study suggests that integrating Visible Learning, self-directed learning, and Assessment for Learning provides a coherent approach for supporting this goal. The VL-SDL Model offers both a conceptual framework and practical guidance for designing learning environments that emphasize clarity, feedback, and learner engagement.

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